

1           1.       In a computer system environment having at least one software component  
2 and at least one peripheral hardware device, a method for dynamically offloading, on a per-  
3 packet basis and depending on the then current needs of the computer system, an operating  
4 task from the software component to the peripheral hardware device thereby freeing up  
5 host processor resources and increasing the overall efficiency of the computer system, the  
6 method comprising:

7                   a step for enabling selected task offload capabilities of the peripheral  
8 hardware device to the extent such selected task offload capabilities are needed for  
9 one or more packets; and

10                  in the event that an operating task to be performed for a packet by the  
11 software component corresponds to an enabled task offload capability on the  
12 peripheral hardware device, and depending on the then current needs of the  
13 computer system, performing the act of selectively offloading the operating task  
14 from the software component to the peripheral hardware device by sending a data  
15 packet to the peripheral hardware device indicating that the peripheral hardware  
16 device perform the specified operating task, the operating task being a task that  
17 peripheral hardware device is capable of performing.

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19           2.       A computer-readable medium having computer-executable instructions for  
20 performing the step and act recited in claim 1.

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22           3.       A method as recited in claim 1, wherein the peripheral hardware device is a  
23 network interface card (NIC) that is operatively connected to the computer system.  
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4. A method as recited in claim 3, wherein the data packet sent to the NIC indicates that the NIC is to perform the specified operating task on the data packet sent to the NIC, the data packet sent to the NIC for dispatch on a network.

5. A method as recited in claim 3, wherein the data packet sent to the NIC indicates that the NIC is to perform the specified operating task on a data packet received by the NIC from the network.

6. A method as recited in claim 1, wherein the software component is a network software application executing in a layered network model.

7. A method as defined in claim 1, wherein the selected task offload capabilities of the peripheral hardware device are enabled by setting at least one flag indicator in a task offload buffer associated with the peripheral hardware device.

8. A method as defined in claim 1, wherein the packet is a network data packet comprising network data and packet extension data, wherein the packet extension data is comprised of at least one data field indicative of at least one operating task to be performed by the peripheral hardware device.

9. A method as defined in claim 8, wherein the peripheral hardware device is a Network Interface Card (NIC).

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10. A method as defined in claim 1, wherein the operating task is selected from one or more of the following operating tasks: a checksum operation; an encryption operation; a message digest calculation operation; a TCP segmentation operation; a UDP segmentation operation; a decryption operation; a TCP packet assembly operation; a UDP packet assembly operation; a packet classification operation; and a Denial of Service filter operation.

1           11. In a computer system environment having at least one software component  
2 and at least one peripheral hardware device, a method for dynamically offloading, on a per-  
3 packet basis and depending on the then current needs of the computer system, an operating  
4 task from the software component to the peripheral hardware device thereby freeing up  
5 host processor resources and increasing the overall efficiency of the computer system, the  
6 method comprising:

7                     the act of the software component communicating with the peripheral  
8 hardware device to enable task offload capabilities on the peripheral device needed  
9 for one or more packets; and

10                    in the event that an operating task to be performed for a packet by the  
11 software component corresponds to an enabled task offload capability on the  
12 peripheral hardware device, and depending on the then current needs of the  
13 computer system, performing the act of selectively offloading the operating task  
14 from the software component to the peripheral hardware device by sending a data  
15 packet to the peripheral hardware device indicating that the peripheral hardware  
16 device perform the specified operating task, the operating task being a task that  
17 peripheral hardware device is capable of performing.

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19           12. A computer-readable medium having computer-executable instructions for  
20 performing the acts recited in claim 11.

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22           13. A method as recited in claim 11, wherein the peripheral hardware device is  
23 a network interface card (NIC) that is operatively connected to the computer system.  
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1           14.     A method as recited in claim 13, wherein the data packet sent to the NIC  
2 indicates that the NIC is to perform the specified operating task on the data packet sent to  
3 the NIC, the data packet sent to the NIC for dispatch on a network.  
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5           15.     A method as recited in claim 13, wherein the data packet sent to the NIC  
6 indicates that the NIC is to perform the specified operating task on a data packet received  
7 by the NIC from the network.  
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9           16.     A method as recited in claim 11, wherein the software component is a  
10 network software application executing in a layered network model.  
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12           17.     A method as defined in claim 11, wherein the selected task offload  
13 capabilities of the peripheral hardware device are enabled by setting at least one flag  
14 indicator in a task offload buffer associated with the peripheral hardware device.  
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16           18.     A method as defined in claim 11, wherein the packet is a network data  
17 packet comprising network data and packet extension data, wherein the packet extension  
18 data is comprised of at least one data field indicative of at least one operating task to be  
19 performed by the peripheral hardware device.  
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21           19.     A method as defined in claim 11, wherein the operating task is selected  
22 from one or more of the following operating tasks: a checksum operation; an encryption  
23 operation; a message digest calculation operation; a TCP segmentation operation; a UDP  
24 segmentation operation; a decryption operation; a TCP packet assembly operation; a UDP

1 packet assembly operation; a packet classification operation; and a Denial of Service filter  
2 operation.

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1           20.     A computer-program product for use in a computer system environment  
2     having at least one software component and at least one peripheral hardware device, the  
3     computer-program product for implementing a method for dynamically offloading, on a  
4     per-packet basis and depending on the then current needs of the computer system, an  
5     operating task from the software component to the peripheral hardware device thereby  
6     freeing up host processor resources and increasing the overall efficiency of the computer  
7     system, the computer-program product including a computer-readable medium having  
8     stored thereon computer-executable instructions for performing the following:

9                     an act of communicating with the peripheral hardware device to enable task  
10                    offload capabilities on the peripheral device needed for one or more packets; and

11                    in the event that an operating task to be performed for a packet by the  
12                    software component corresponds to an enabled task offload capability on the  
13                    peripheral hardware device, and depending on the then current needs of the  
14                    computer system, performing the act of selectively offloading the operating task  
15                    from the software component to the peripheral hardware device by causing a data  
16                    packet to be sent to the peripheral hardware device indicating that the peripheral  
17                    hardware device perform the specified operating task, the operating task being a  
18                    task that peripheral hardware device is capable of performing.

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20           21.     A computer-program product as recited in claim 20, wherein the computer-  
21     readable media is one or more physical storage media.